

# Foreword

## Multimedia for a Mobile World

Welcome to ISSCC2006, the 53<sup>rd</sup> appearance of the foremost forum for the presentation of advances in solid-state semiconductor circuits and systems. Paper submissions this year reached an all-time high of 680, a 17% increase from the 579 papers submitted last year. This year, the ISSCC program is the largest-ever, with 255 technical papers presented in 33 regular sessions, along with a three-paper Plenary Session to open the Conference. There are also nine Tutorials from which to choose, six Special-Topic Evening Sessions, three Panel Evening Sessions, six all-day Advanced-Circuit-Design Forums, and one all-day Short Course, making this the most extensive ISSCC program ever assembled. As well, DAC/ISSCC and A-SSCC Student-Design-Contest winners will present their work at poster presentations.



The geographical distribution of the submitted technical papers illustrates the truly- international character of the Conference:

This year, 45% of the accepted papers are from North America, 23% from Europe, and 32% from the Far East. Of all of these, 46% are from industry, and 54% are from universities.

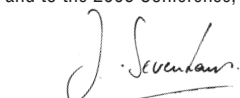
The Conference theme for 2006 is “**Multimedia for a Mobile World**”: Today, electronic multimedia is an indispensable part of life. Broadband Internet with megabit-per-second capability on copper, has replaced the kilobit-per-second modems of the past. Digital music and video, as well as industrial data, run at the speed of light around the globe, for ubiquitous use in new consumer and professional products and applications. Enablers of this media-revolution have been the ever-deeper deep- submicron silicon circuits going to nano-dimensions, now providing cheaply the giga-scale integration of IP in system-on-a-chip multimedia equipment. To mark this major transition, this year's Conference will highlight papers on new circuit techniques and devices supporting this mobile and multimedia tour of triumph for semiconductors. Advanced semiconductor technology, wireless and broadband interconnection, multimedia applications, and real-time entertainment, are driving the semiconductor business today. But, circuit research is facing new challenges with deep-nano-CMOS devices, learning to cope with high-leakage gates, low-linearity performance, but plenty of bandwidth, opening new opportunities. Such is the case for converters in 65nm and smaller in silicon, and other devices such as carbon nanotubes and organic materials coming closer to commercial realization.

The quality of this year's technical papers continues the tradition of excellence associated with ISSCC: In the **Analog & RF** arena, Sessions 11, 19, 25 32, focus on power-efficiency for wireless transceivers and for audio in home-theater and automotive applications. CMOS at 70GHz is also a major highlight in Session 32, and digital-correction techniques become a major factor in high-precision analog transceiver circuitry. **Data Converters** presented in Sessions 3, 12, 31, focus on high-speed high-resolution and high-efficiency designs, thereby moving the ADC closer to the antenna in wireless and RF receivers. **Digital** Circuits and Microprocessors presented in Sessions 5, 21, 24, 29, are highlighted this year, with papers describing up to 16-multi-core parallelism, and the first 65nm processors marks the next level of integration and performance. High-speed I/O techniques are presented as the true enablers of multicore processing, by providing the signaling between the parallel cores. **Imagers, MEMS, Medical and Display**, presented in Sessions 2, 9, 16, 27, highlight medical-application achievements such as a 32-site 4-channel cochlear-implanted microelectrode array, and a low-power implantable retinal prosthesis. As well, highlights include a 6.5Mpixel CMOS imager for digital still cameras with photographic quality at 60 frames- per-second, and an SOI micromechanical accelerometer achieving the resolution needed for inertial navigation. In the **Memory** arena, Sessions 7, 8, 34, highlight NROM-based flash memory enabling 4-bit storage in a single memory cell, and the smallest 8-Gbit multilevel NAND flash memory ever reported. In Session 34, the focus is on a 5GHz SRAM design for a high-performance CPU. **Signal Processing**, in Session 14, highlights a DSSS UWB baseband transceiver for wireless and adhoc networks, and, in Session 22, features a 120Mvertices/s processor with half the power and 3 times the performance of previous chips. **Technology Directions**, in Sessions 15, 17, 23, 30, has selected an outstanding number of papers whose highlights include organic RFID employing 2000- organic-transistors integrated on a plastic substrate, and a Braille sheet updatable in 2 seconds to allow an e-book for the blind. **Wireless**, in Sessions 6, 10, 20, 26, 33, highlights fully integrated UWB transceivers and synthesizers covering all 14 bands in CMOS, and presents the first 802.11abg single-chip front-end-to-MAC integration in CMOS. Also, low-power Zigbee, full integration of GSM/GPRS in 0.13 CMOS, and a single-chip 1.9GHz PHS cell phone are featured. In the **Wireline** arena, Session 3 highlights a 6.4Gb/s SerDes design with Feed-Forward and Decision-Feedback Equalization for computer backplanes, and Session 18 features a 20Gb/s VCSEL driver design, and an RF/Baseband FDMA-interconnect transceiver for reconfigurable chip-to-chip I/O.

These samples represent only a glimpse of the outstanding papers assembled by the ISSCC International Technical-Program Committee (ITPC) for presentation at ISSCC 2006. The ITPC is composed of 173 experts from around the world: 74 from North America, 55 from the Far East, and 41 from Europe, each working in one of the nine technical-program subcommittees. Each member has made tremendous contributions in many ways: reviewing technical papers; organizing and creating the extensive educational programs – Special-Topic Sessions, Panels, Forums, and Tutorials; as well as preparing material for the Advance Program, Press-Kit, and Technical Digest. To fulfill these tasks, they all met in June and October, and will continue to work right up to, and through, the Conference, helping to ensure high-quality Sessions. My sincere gratitude and appreciation goes to all of them. I would like especially to recognize the outstanding work of the Subcommittee Chairs: John Long (Analog & RF), David Robertson (Data Converters), Sam Naffziger (Digital), Daniel McGrath (Imagers, MEMS, Medical and Displays), Katsuyuki Sato (Memory), Wanda Gass (Signal Processing), Anantha Chandrakasan (Technology Directions), Trudy Stetler (Wireless & RF Communications), and Franz Dielacher (Wireline Communications). In addition, I would like to thank several Executive Committee members: Kunihiro Iizuka, Jinyong Chung, and Takayuki Kawahara from the Far-East Region, and Albert Theuvsen, Rudolf Koch, and Qiuting Huang from the European Region, for their tremendous efforts to enable the smooth operation of the ITPC format, and their assistance with the planning and execution of ISSCC 2006. In addition, for their help in organizing the plenary papers, my special thanks go to Kerry Bernstein, Franz Dielacher and Yoshiaki Hagiwara.

In addition, I would like to express my thanks to several others: to Jan Van der Spiegel for his assistance as Program Vice-Chair; to Diane Melton and Molly Bartkowski, at Courtesy Associates, for their excellent work with the Conference arrangements, operations, registration, and other activities; to Dan Gerken for his work on electronic manuscript-submission-and-distribution formatting, Advance Program, Digest CD, Conference DVD, and Short-Course CD; to Steve Bonney for his work with the Advance Program, the Press Kit, and the Digest; to Mandana Amiri, Glenn Gulak, Shahriar Mirabbasi, and Richard Spencer for their excellent editorial work in the preparation of the Advance Program and the Digest; to Laura Fujino and Kenneth Smith for their outstanding work with all aspects of the Conference, in particular the Advance Program, Press-Kit and press meetings, Awards, Digest, Digest CD, Visuals Supplement, Short-Course CD and the DVD of the Digest/Visuals-Supplement; to Willy Sansen for coordinating the Tutorials and Circuit Forums; to Terri Fiez for organizing the Short Course; to Frank Hewlett for recording meeting minutes, maintaining Conference-task procedures, maintaining the ISSCC Web site, and for coordinating the Advance Program and Press-Kit data assembly; to John Trnka for coordination of the audio-visual services for the Conference; and to David Pricer for handling Corporate Relations, and his overall support, sharing his extensive experience with ISSCC.

Finally, I would like to express my special thanks to Tim Tredwell for the leadership, vision, and support, that he has given to the International Technical-Program Committee, and to the 2006 Conference, overall.



Jan Sevenhans, ISSCC2006 International-Program-Committee Chair